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ENTOMOLOGICAL NEWS

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Take Offs by Prey-Laden Wasps (Hymen· : Pompilidae?, Sphecidae).

By W. V. BALDUF, University of Illinois, Urbana.

In the summer of 1939, I chanced to observe two isolated instances that indicate certain predatory wasps at least occasionally ascend on foot to some elevated vantage point in order to take off by flight when burdened heavily with paralyzed prey they are in the process of transporting to their nesting sites. No effort has been made to review the similar cases that have doubtlessly been recorded in the literature.

The first instance involved a rather large black wasp that resembled a pompilid in general appearance, and a medium-sized green adult tettigoniid orthopteran. In the brief glance afforded me, I was unfortunately not able to identify either predator or prey more fully. It was about 5:00 P. M., of August 8 and on the back porch of my mother's home at Oak Harbor, Ohio, that I happened upon the wasp standing on the porch floor astride the long-horn. Presumably the hopper had been seized in the honeysuckle vines that decorated the adjacent end of the porch, for tettigoniid stridulations had emanated from this growth on previous days.

When first seen, the wasp had already chewed a hole through the vertex of the captive's head and stood feeding from the perforation. But in a few seconds, she started gingerly toward the wooden porch post four feet away, and upon reaching it climbed approximately four feet vertically on it, remaining astride the victim all the time as she proceeded. From this high point she took off through the air without further delay, and, carried by a stiff wind attained an elevation of about 15 feet just before she disappeared beyond my vision.

The second instance was observed as I walked through the campus woods of the University at 7:45 A. M., of August 1. There I came across a cicada-killing wasp, *Sphecius speciosus*

(Dru.) in possession of an already inactivated large green cicada, probably *Tibicen linnei* (Sm. and Grosb.). Curious to learn what was to happen next, I came to a stop not more than two feet from where the wasp stood over her prey. In a moment, *speciosus,* standing astride of and dragging her catch, proceeded toward me and climbed at once upon my left shoe, then successively up the outside of a trouser leg, over the shirt front and a shoulder, and around the back of the neck to the top of the head. Whereas the horizontal approach to the shoe was made slowly, the vertical climb was accomplished with a burst of speed that recalled the sudden response made by an airplane when the accelerator is pushed quickly down for the take off. The ascent to the height of six feet and three inches was therefore completed in only a few seconds. From that more advantageous elevation, *speciosus* promptly zoomed away among the trees with her load, and was gaining elevation slowly as she faded from view.

In order to determine the approximate carrying power of this wasp during flight, I weighed a female freshly killed in a cyanide jar and two females of *Tibicen linnei* that had probably fallen dead out of trees on the day they were found. One of the cicadas weighed 1.4 grams, the second 2.1 grams, whereas the wasp balanced the chinomatic scale at 0.3536 gram. *Sphecius speciosus* is therefore probably capable of flying a prey load four to six times greater than her own weight to her nesting site.

In most cases, the cicada killer presumably overcomes her captives where she catches them in trees and would therefore usually not be obliged to ascend on foot to some vantage point in order to take off. In their struggle with the living cicadas, some *speciosus* probably chance to fall to the ground, as may have been true in the instance described above. Although possibly exceptional, this case is nevertheless of interest in showing that such accidents need not frustrate the wasp in her activity of provisioning her nest.

A Bibliography of Keys for the Identification of Immature Insects. Part II. Odonata.

By Wm. P. Hayes.

(Continued from page 69.)

Needham, J. G. 1897. Preliminary studies of N. American Gomphinae. *Can. Ent.*, 29 (7): 164-168, (8): 181-186, pl. 7. (Key to genera, pp. 167-168).

Id. 1903. Aquatic insects in New York State. Life histories of Odonata Suborder Zygoptera Damselflies, *N. Y. State Mus. Bull.* 68: 218-276, figs. 3-17, pls. 5, 11-19. (Key to families, subfamilies, genera and species.)

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Needham, J. G. and Betten, C. 1901. Aquatic insects in the Adirondacks. *N. Y. State Museum Bul.*, 47. Odonata: 429-540. (Various keys mostly to genera).

Needham, J. G. and Fisher, E. 1936. The nymphs of North American Libelluline Dragonflies. *Trans. Am. Ent. Soc.* 62: 107-116, pls. vi, vii. (Key and verification table to genera, pp. 113-115.)

Needham, J. G. and Gyger, M. K. 1937. The Odonata of the Philippines. *Philip. Jl. Sci.* 63 (1): 21-101, 10 pls. (Many keys to nymphs of Anisoptera as far as genera throughout the paper.)

Id. 1939. The Odonata of the Philippines. II. Suborder Zygoptera. *Philip. Jl. Sci.* 70 (3): 239-314, pls. 11-22, 2 figs. (Keys to nymphs as far as genera, pp. 244-260.)

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NEEDHAM, J. G. and HEYWOOD, H. B. 1929. A handbook of the dragonflies of North America, vii, 378 pp., many figs. Thomas Co., Springfield, Ill. (Many keys as far as genera, many tables to spp. throughout the book.)

NEEDHAM, J. G. and NEEDHAM, P. R. 1927. Guide to the study of fresh water biology, 88 pp. Amer. Viewpoint Soc., N. Y. (Key to genera, pp. 14-20, pls. 4-7.)

NEVIN, F. R. 1929. Larval development of *Sympetrum vicinum* (Odonata: Libellulidae). *Trans. Amer. Ent. Soc.* 55: 79-102. (Key to instars of this species, p. 100.)

ID. 1930. A study of the larva of *Calopteryx* (*Agrion*) *maculata*. *Trans. Amer. Ent. Soc.* 55: 425-448, pl. xvii. (Key to instars, p. 446.)

NUNNEY, W. H. 1894. Larvae-nymphs of British dragonflies. *Science Gossip* (n. s.) 1 (4): 80-82, 3 figs.; (5): 100-102, figs. 1-5; (6): 129-131, figs. 7-15; (7): 148-150, figs. 16-26; (8): 176-177. (No keys, but diagnostic synopsis of 30 spp., pp. 176-177.)

PETERSON, ALVAH. 1939. Keys to the orders of immature stages (exclusive of eggs and pronymphs) of North American insects. *Ann. Ent. Soc. Amer.* 32 (2): 267-278. (Keys leading to Odonata, pp. 268-270.)

PULKKINEN, A. 1927. Über die Larven einiger Odonaten III. *Notulae entom.* 7: 11-12. (Keys to 3 spp. of *Leucorrhinia* and 7 spp. of *Sympetrum* of Finland.)

RIS, F. 1909. Die Süsswasserfauna Deutschlands. Odonata. Jena. Heft 9, pp. 1-67, 79 figs. (Keys to genera and some species, pp. 44-65).

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ID. 1920. Übersicht der Mitteleuropäischen *Lestes*-Larven. *Festschrift Zschokke* No. 22, 14 pp., 7 figs., Basel. (Key to 6 spp., pp. 4-6).

ID. 1921. The Odonata or Dragonflies of South Africa. *Ann. S. Afric. Mus.* 18 (3): 245-452, pls. v-xii, 6 figs. (No S. African larvae, except that of *Chlorolestes*, are described

or figured, but the more striking characters of Gomphine (p. 339), Aeschnine (p. 357), Corduline (p. 375) and Libelluline (pp. 383-4) nymphs are given.)

Roster, Dante Alessandro. 1885. Contributo all'anatomia ed alla biologia degli Odonati. *Boll. Soc. Ent. Ital.* 17: 256-268, tav. iii, iv. (Distinguishes 2 groups of Odonate larvae: Caudobranchiati and Rectobranchiati, p. 259.)

Id. 1886. Cenno monografico degli Odonati del gruppo Ischnura. *Boll. Soc. Ent. Ital.*, 18: 239-258, tav. ii-vi. (Distinguishes two species of Agrion, pp. 241-245).

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Rousseau, E. 1908. Contributions a la connaissance des métamorphoses des Odonates d'Europe. *Ann. Soc. Ent. Belg.* 52: 272-291. (Summary of characters distinguishing nymphs of 4 spp. of *Sympetrum*, p. 291.)

Id. 1909. Étude monographique des larves des Odonates d'Europe. *Ann. Biol. Lacustre.* 3: 300-366, 47 figs. (Various keys to genera and species).

Id. 1921. Les larves et nymphs aquatiques des insectes d'Europe, Vol. 1. Office de Publicité Anc. Etabliss J. Lebegue & Co., 967 pp. Brussels, (Odonata—pp. 101-161, Keys to genera and some spp.)

Schmidt, E. 1929. Libellen, Odonata. In *Die Tierwelt Mitteleuropas*. Bd. 4, Lief. 1b, pp. 1-66, 55 figs. Leipzig, Quelle & Meyer. (Tabulation of family and some generic characters, pp. 63-64, fig. 55).

Id. 1936. Die mitteleuropäischen *Aeschna*-Larven nach ihren lezten Häuten. *Deutsche Ent. Ztschr.* 1936 (I/II): 53-73, 15 figs. (Key to 10 spp. and subspp., pp. 60-63.)

Id. 1936. Die europäischen *Leucorrhinia*-Larven, analytisch betrachtet. *Arch. Naturges.* (N. F.) 5 (2): 287-295, 9 figs. (Key to 5 spp., p. 289.)

Id. 1936. Die westpaläarktischen Gomphiden-Larven nach ihren letzten Häuten. *Senckenbergiana* 18 (5/6): 270-282, 10

figs., 1 table. (Key to 11 spp., pp. 274-277.)

SEEMAN, M. T. 1927. Dragonflies, Mayflies and Stoneflies of Southern California. *Jour. Ent. and Zool.,* 19: 1-69, figs., pls. i-iv. (Odonata—pp. 5-39, figs. Keys to genera and some spp.)

TILLYARD, R. J. 1910. Monograph of the genus *Synthemis. Proc. Linn. Soc. N. S. Wales* 35 (2): 312-377, pls. iv-ix, 3 figs. (Table of differentials of nymphs 3 spp. of *Synthemis,* 1 sp. of *Metathemis,* 1 sp. of *Choristhemis,* p. 373.)

ID. 1911. On the genus *Cordulephya. Proc. Linn. Soc. N. S. Wales* 36 (2): 388-422, pls. xi, xii. (Larvae of 2 spp. described, compared with each other, p. 405, and with other Corduline larvae, pp. 406-409.)

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ID. 1908. (Same title) Neue billige Ausgabe mit einem Anhang: Neuere Beobachtungen. Gotha Friedrich Emil Perthes. Pp. [4], 324, 96 textfigs., 23 pls. (Diagnoses of the spp. of larvae of Odonata, pp. 69-72, taf. 12.)

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ID. 1913. New nymphs of Canadian Odonata. *Can. Ent.*, 45: 161-170, pls. i, ii. (Key to two species of *Boyeria* p. 164, comparisons of spp. of *Nehalennia, Enallagma, Neurocordulia, Tetragoneuria, Somatochlora, Leucorrhinia.*)

ID. 1914. The known nymphs of the Canadian species of *Lestes. Can. Ent.*, 46: 189-200, pls. xiii, xiv. (Key to species pp. 190-191).

ID. 1914. New and little known nymphs of Canadian Odonata. *Can. Ent.*, 46: 349-356, 369-377, pls. xxiii, xxv. (Key to two species of *Lestes*, p. 349, comparative table of *Aeshna palmata* and *umbrosa* p. 373.)

ID. 1915. Notes on the Odonata of the vicinity of Go Home Bay, Georgian Bay, Ontario. Suppl. *47th Ann. Rep. Dept. Marine & Fisheries, Fish. Branch*: 53-94, pls. iii-ix. (Many comparative notes on nymphs, key to *Boyeria* 2 spp., p. 74.)

ID. 1916. The nymphs of *Enallagma cyathigerum* and *E. calverti. Can. Ent.* 48: 192-196, pl. ix.

ID. 1916. The nymphs of the North American species of *Leucorrhinia. Can. Ent.*, 48: 414-422, pls. xii, xiii. (Key to 6 spp., pp. 415-416).

ID. 1917. The known nymphs of the North American species of *Sympetrum. Can. Ent.*, 49: 409-418, pls. xix, xx. (Key to species pp. 410-413).

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ID. 1934. The nymphs of *Aeschna juncea* L. and *subarctica* Wlk. *Can. Ent.* 66: 267-274, 2 figs., pls. 11, 12.

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WILLIAMSON, E. B. 1900. The dragonflies of Indiana, 24th *Ann. Rept. Indiana Dept. Geol. and Nat. Resources*, pp. (3), 233-333, 1003-1011, 7 pls. (Uses Calvert's 1893 key to genera, pp. 244-246).

Two New Texas Buprestidae (Coleoptera).

By JOSEF N. KNULL, The Ohio State University, Columbus.

Acmaeodera gillespiensis n. sp.

♀.—Slightly more robust than *A. obtusa* Horn., but of same general form. Head, pronotum and ventral surface bronze, elytra dark blue with yellow markings as follows: basal three-fourths of sides of pronotum, an irregular transverse basal band exclusive of umbone and scutellar regions, an irregular transverse median band, also one on apical fourth and one at apex, none of bands touching suture.

Head with slight frontal depression; surface densely coarsely punctured, punctures separated by fine lines, densely pubescent; antennae reaching to middle of pronotum when laid along side, serrate from the fifth joint.

Pronotum convex, two median depressions and a basal depression each side; margins entire, not visible from above; wider at base than in front, widest in middle; sides broadly rounded; surface densely coarsely punctured, punctures larger than on head, a transverse basal corrugated stripe, pubescence dense. Scutellum not evident.

Elytra at base same width as base of pronotum, wider than pronotum just back of base which is widest point; sides expanded back of base, constricted in front of middle, widened back of middle, broadly rounded to rounded apices, apical margins serrate; disk somewhat flattened, with depression at scutellum, first and third costae raised; surface deeply, coarsely, densely punctured, punctures arranged in rows, separated by less than their own diameters, interspaces with finer punctures, pubescence not dense.

Abdomen beneath coarsely densely punctured, pubescent, last ventral without carina. Prosternal margin straight, not reaching front angles.

Length 10.3 mm.; width 4 mm.

Holotype female collected in Gillespie County, TEXAS, June 20, 1940, by D. J. and J. N. Knull, in collection of writer.

According to Fall's key* this species would come under the truncate group and should stand next to *obtusa* Horn. It is distinguished by the large densely placed punctures of the pronotum, much larger punctures of elytra, lack of carina on last ventral, raised third costa and very sinuate elytral margin when viewed from the side.

Mr. M. A. Cazier kindly compared the specimen with the type of *A. perforata* Caz.

Cinyra roburella n. sp.

♂.—Larger and more robust than *C. gracilipes* (Melsh.), pronotum and elytra dark bronze, head, ventral area and legs cupreous, more shining than above.

Head convex, a median line extending from pronotum one-third down front; surface rugose on front, with irregular smooth callosities, median one prominent, vertex finely punctured, pubescent; clypeus deeply emarginate; antennae reaching to extreme hind angles of pronotum when laid along side margins, scape stout, second joint twice as long as wide, third

* H. C. Fall, N. Y. Ent. Soc., V. 7, pp. 1-37, 1899.

joint longer than scape, fourth joint longest, following joints decreasing in length, joints four to eleven inclusive flattened, serrate.

Pronotum broader than long, widest at base, constricted at apex; sides broadly rounded in front, subparallel at base; disk convex, a transverse basal depression, faint median depression and lateral depression on each side, small pit in front of scutellum; lateral marginal carina extending nearly to front; surface confluently punctured, punctures larger than on vertex, pubescence lacking. Scutellum triangular, concave, glabrous.

Elytra wider than pronotum, widest back of middle; sides rounded in front, constricted at middle, broadly rounded posteriorly, apices truncate; disk convex, with irregular depressions; surface irregularly costate, densely punctured, punctures smaller than on pronotum, pubescence very short, inconspicuous.

Abdomen beneath densely punctured, pubescent; last abdominal truncate, outer angles produced. Posterior tarsi shorter than tibiae.

Length 16.3 mm.; width 5.5 mm.

♀.—Differs from male by antennae reaching just past middle of pronotum.

Holotype male collected from oak in the Davis Mountains, TEXAS, July 4, 1936, by the writer. In addition to the holotype, allotype and paratypes in collection of the writer from the same locality bearing dates June 13 to Aug. 20, collected by D. J. and J. N. Knull. Paratype labeled Chisos Mtns., Tex. July 17, H. A. Wenzel, in the Wenzel Collection at The Ohio State University.

This species should stand next to *C. gracilipes* (Melsh.) according to Chamberlin's key.** However it differs by being more robust, dull, and having a convex pronotum, more densely punctured dorsal surface and by structure of the male genitalia.

The writer is indebted to Mr. W. S. Fisher for comparing the species with the Schaeffer types.

** W. J. Chamberlin, Ent. News, V. 31, pp. 211-244, 1920.

A Preliminary List of the Culicidae of Michigan Part I. Culicinae (Diptera).*

By WILLIAM H. IRWIN.

This paper presents a list of the Culicidae, subfamily Culicinae, and the names of the counties of Michigan from which the author has records. Previously published records are included. This list includes 18 species new for the state and extends the knowledge of distribution of the previously reported species. This study was based upon a total collection of approximately 33,000 specimens of which about 15,000 are larvae and the remainder adults. Six hundred thirty specimens were loaned to the author from the collections of the Department of Entomology, Michigan State College, by Professor E. I. McDaniel. Also the writer had the privilege of examining a collection of 300 specimens made by C. W. Sabrosky, Michigan State College, and another of about 80 specimens made by R. R. Dreisbach, Midland, Michigan. All others were collected by the writer. Most of the collections by the author were made in the years 1935-1939. Every species included in this list is represented by specimens in the writer's collection. The names used are those employed by Edwards (1932).

1. AEDES ABORIGINIS Dyar. Five females collected from Cheboygan County.

2. AE. AURIFER (Coquillett). Cheboygan and Emmet Counties. Also reported for Michigan by Matheson, 1924.

3. AE. CAMPESTRIS Dyar and Knab. One female collected by R. R. Dreisbach in Midland County, 1937.

4. AE. CANADENSIS (Theobald). Algers, Cheboygan, Emmet, Genesee, Luce, Washtenaw, Wayne and Wexford Counties. Also reported for Michigan by Matheson, 1924.

5. AE. CINEREUS Meigen. Cheboygan, Crawford, Emmet, Ingham, Midland, Presque Isle, and Washtenaw Counties.

6. AE. COMMUNIS (DeGeer). Algers, Cheboygan, Emmet, Luce, and Washtenaw Counties. Also reported for Michigan by Matheson, 1924.

* Contribution from the Biological Station and the Department of Zoology, University of Michigan.

7. Ae. diantaeus Howard, Dyar and Knab. Cheboygan County.

8. Ae. excrucians (Walker). Alpena, Berrien, Calhoun, Cheboygan, Emmet, Ingham, Kent, Keweenaw (Isle Royale), Lapeer, Leelanau, Livingston, Luce, Midland, Tuscola, and Washtenaw Counties. Also reported for Michigan by Matheson, 1924.

9. Ae. fitchii (Felt and Young). Algers, Alpena, Berrien, Cheboygan, Emmet, Ingham, Keweenaw (Isle Royale), Lapeer, Livingston, Luce, Midland, Montcalm, Presque Isle, Roscommon, Tuscola, Washtenaw, and Wayne Counties. Also reported for Michigan by Matheson, 1924.

10. Ae. flavescens (Müller). Cheboygan, Ingham, and Midland Counties.

11. Ae. impiger (Walker). Algers, Cheboygan, and Washtenaw Counties.

12. Ae. implacabilis (Walker). Cheboygan County.

13. Ae. intrudens Dyar. Algers, Cheboygan, Emmet, Ingham, Keweenaw (Isle Royale), Luce, Mackinac, Midland, Presque Isle, Roscommon, Washtenaw, Wayne, and Wexford Counties. Also reported for Michigan by Matheson, 1924.

14. Ae. lateralis (Meigen). Algers, Cheboygan, and Wayne Counties.

15. Ae. pullatus (Coquillett). Cheboygan, Midland, and Roscommon Counties.

16. Ae. punctor (Kirby). Algers, Cheboygan, Emmet, and Luce Counties. Also reported for Michigan by Matheson, 1924.

17. Ae. riparius (Dyar and Knab). Cheboygan and Emmet Counties.

18. Ae. spenceri (Theobald). Cheboygan and Ingham Counties.

19. Ae. sticticus (Meigen). Allegan, Arenac, Emmet, Luce, and Van Buren Counties. Also reported for Michigan by Matheson, 1924.

20. Ae. stimulans (Walker). Calhoun, Cheboygan, Emmet, Ingham, Kent, Keweenaw (Isle Royale), Lapeer, Liv-

ingston, Midland, Washtenaw, and Wayne Counties. Also reported for Michigan by Pettit, 1903.

21. AE. TRICHURUS (Dyar). Cheboygan, Emmet, Lake, Midland, Oscola, and Roscommon Counties. Also reported for Michigan by Matheson, 1924.

22. AE. TRISERIATUS (Say). One specimen collected from Emmet County.

23. AE. VEXANS (Meigen). Alpena, Berrien, Cheboygan, Emmet, Genesee, Gratiot, Ingham, Kalamazoo, Kent, Washtenaw, Wayne, and Wexford Counties. Also reported for Michigan by Matheson, 1924.

24. ANOPHELES MACULIPENNIS Meigen. Cheboygan, Emmet, Genesee, Ingham, Kent, Midland, Presque Isle, Washtenaw, Wayne, and Wexford Counties. Also reported for Michigan by Pettit, 1903.

25. AN. PUNCTIPENNIS (Say). Cheboygan, Emmet, Genesee, Midland, Montmorency, Presque Isle, Washtenaw, and Wexford Counties. Also reported for Michigan by Pettit, 1903.

26. AN. QUADRIMACULATUS Say. Cheboygan, Emmet, Genesee, Ingham, Montcalm, and Washtenaw Counties.

27. AN. WALKERI Theobald. Cheboygan, Emmet, Genesee, Ingham, Kent, and Washtenaw Counties. Also reported for Michigan by Dyar, 1922.

28. CULEX APICALIS Adams. Cheboygan, Emmet, Genesee, Ingham, Wexford, and Van Buren Counties. Also reported for Michigan by Jewell and Brown, 1929.

29. C. PIPIENS Linnaeus. Cheboygan, Emmet, Genesee, Ingham, Washtenaw, Wayne, and Wexford Counties. Also reported for Michigan by Pettit, 1903.

30. C. PECCATOR Dyar and Knab. One specimen collected in Ingham County, August, 1938, by E. I. McDaniel.

31. C. SALINARIUS Coquillett. Cheboygan, Genesee, Ingham, and Midland Counties.

32. C. TARSALIS Coquillett. Cheboygan and Emmet Counties.

33. C. TERRITANS Walker. Cheboygan, Emmet, Genesee, Ingham, St. Joseph, Washtenaw, Wayne, and Wexford Coun-

ties. Also reported for Michigan by Matheson, 1924.

34. MANSONIA PERTURBANS (Walker). Cheboygan, Emmet, Mackinac, and Wexford Counties. Also reported for Michigan by Pettit, 1903.

35. PSOROPHORA CILIATA (Fabricius). Ingham, Kent, Livingston, and Wayne Counties. Also reported for Michigan by Pettit, 1903.

36. PS. FEROX (Humboldt). Collected from Ingham County, 1933. Also reported for Michigan by Pettit, 1903.

37. THEOBALDIA IMPATIENS (Walker). Cheboygan County. Also reported for Michigan by Jewell and Brown, 1929.

38. TH. INCIDENS (Thomson). Cheboygan and Emmet Counties.

39. TH. INORNATA (Williston). Cheboygan, Emmet, and Genesee Counties. Also reported for Michigan by Matheson, 1924.

40. TH. MELANURA (Coquillett). Wexford County.

41. TH. MORSITANS (Theobald). Cheboygan, Emmet, and Washtenaw Counties. Also reported for Michigan by Matheson, 1924.

42. URANOTAENIA SAPPHIRINA (Osten Sacken). Berrien, Cheboygan, and Ingham Counties. Also reported for Michigan by Pettit, 1903 and recorded for Washtenaw County by Hinman, 1935.

43. WYEOMYIA SMITHII (Coquillett). Cheboygan County. Also reported for Michigan by Matheson, 1924.

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Notes on the Nearctic Geosarginae (Diptera: Stratiomyiidae).

By MAURICE T. JAMES, Colorado State College, Fort Collins.

In a previous paper[1] I published an account of the Nearctic Geosarginae which, in the light of further study and with the accumulation of additional information, is in need of revision. The present paper attempts to bring this review up to date.

Revised Key to the Genera.

1. Scutellum spined—*Nothomyia* (belongs to Stratiomyinae). Scutellum unspined (Geosarginae) 2
2. Second segment of antennae produced into third in a finger-like process, especially visible on inner side, *Ptecticus*

[1] Canad. Ent., 47, pp. 267-275, 1935.

Second segment of antennae sometimes convex, but not produced into a finger-like process.....3

3. Eyes densely and conspicuously pilose.....*Chloromyia*
Eyes bare 4

4. Anterior ocellus remote from other two by a distance much greater than length of base of ocellar triangle (except in *G. perpulcher*); distance from r-m to origin of R_{2+3} greater than length of r-m.....*Geosargus*
Ocelli approximately equidistant from each other.....5

5. Abdomen relatively short and broad, much wider than thorax and (excluding segment five) no longer than broad; eyes of male contiguous, divided into definite zones of different sized facets; distance from r-m to origin of R_{2+3} greater than length of r-m.....6
Abdomen barely, if any, wider than thorax, and two to three times as long as wide; eyes in both sexes separated and not divided into zones of different sized facets; origin of R_{2+3}, in American species known to me, before, at, or but slightly beyond r-m.....7

6. Discal cell small; posterior veins weak, evanescent toward wing margin; anal cell as broad as combined basal cells .....*Microchrysa*
Discal cell of usual size; posterior veins evident to wing margin; discal cell wider than basal cells individually, about two-thirds their combined width,
Cephalochrysa[2]

7. Lower squama with a strap-like projection (Neotropical and Old World) .....*Chrysochroma*
Lower squama without such a projection (Nearctic and Neotropical) .....*Merosargus*

Ptecticus trivittatus melanopus, ssp. nov.

In all respects a typical *P. trivittatus,* except that the tarsi and the apical two-thirds of the hind tibiae are black, the front and middle tibiae are blackish anteriorly on the apical two-fifths; and each antenna bears on the inner side of the third segment a pair of black spots, one near the base of the arista, the other at the opposite apical corner.

[2] See Ent. News, 50, p. 218, 1939.

Holotype, ♂, Columbus, OHIO, Sept. 1, 1939 (J. Enke) Ohio State University collection.

CHLOROMYIA FORMOSA Scopoli. Two males, Rochester, New York, July 16, 1939 (Amer. Mus. Nat. Hist.). This is the first record in America of this common Palaearctic species.

GEOSARGUS LUCENS Loew.

Sargus lucens Loew, 1866, Cent., VII, 11 (♂).

Sargus tricolor Loew, 1866, Cent., VII, 12. (♀).

Macrosargus clavis Williston, 1895, Canad. Ent., 17: 123 (♂;♀).

A widely distributed and somewhat variable species. I have seen a female from Clarksville, Tennessee, which agrees with the form described as *tricolor,* but I believe this is merely a color variation.

MICROCHRYSA POLITA L. and M. FLAVICORNIS Meig. are both widely distributed throughout the United States, but evidently neither is of common occurrence.

CEPHALOCHRYSA Kertész. To this genus belong the four species which in my previous paper I assigned to *Isosargus.*

MEROSARGUS CAERULIFRONS Johnson. This species, formerly placed in *Geosargus,* is a true *Merosargus.*

Merosargus beameri, n. sp.

♂. Head black, with a green cast, especially on the face; the vertex, post-vertical area, and middle of front as far as the frontal calli, however, metallic green; frontal calli ivory white, subinterrupted; black areas of front densely punctured. Front broadest below; ratio of vertex on posterior margin, front anterior to unpaired ocellus, and front at calli, 11: 9:11. Pile on upper part of front black and brownish-yellow intermixed, on lower part of front and face short, black; on cheeks, longer, yellow. Antennae brownish-yellow, their pile black; arista at base somewhat more blackish, thickened, and black-haired; segments subequal in length.

Thorax, except a slender notopleural margin, wholly metallic green, the dorsum, however, especially behind the suture and on the scutellum and metascutellum with a decided violet cast; dorsum with short, inconspicuous, erect, black pile and with longer, rather conspicuous, appressed yellow pile; pile elsewhere white, except on the metanotal slopes, where there is some long black pile intermixed with the more abundant white.

Legs yellow, except the last two or three segments of the front and hind tarsi, the apical three-fifths of the hind tibiae, and the apical three-fourths of the hind femora (especially above); pile in general black on black areas and also on apical segments of middle tarsi, otherwise yellow.

Halteres yellow, somewhat darkened on knob. Wings hyaline; veins brown, almost black in places; R_{2+3} arising slightly beyond r-m, converging somewhat toward R_1 but ending independently of it.

Abdomen widening gradually to apex of fourth segment; length almost three times maximum width; color metallic green with violet reflections, unmarked with yellow except narrow base of second and narrow apex of fourth segments of venter, and genitalia, the latter wholly bright yellow; pile short, black, inconspicuous; the basal three segments, and to a much less extent the fourth and base of the fifth segments, have, in addition, on the sides of the terga a long, pale yellow pile which greatly obscures the black. Length, 8.5 mm.

Holotype, ♂, Baboquivari Mountains, ARIZONA, July 19, 1932 (R. H. Beamer). Snow Entomological Collection, University of Kansas.

Runs in Curran's key (Amer. Mus. Nov., 534, p. 1-2) to *cingulatus* Schiner; but the lack of extensive yellow markings will readily distinguish it from *cingulatus*, the described Mexican species not included in Curran's key, and, indeed, from most other described species of the genus. *M. caerulifrons*, which also has the unicolorous abdomen, may at once be distinguished by its yellow pleura.

Henry Clinton Fall Memorial Publication Fund.

The Pacific Coast Entomological Society has recently received a gift of securities valued at $1000. from the estate of the late H. C. Fall, to be known as the Henry Clinton Fall Memorial Publication Fund, according to the January issue of the *Pan-Pacific Entomologist*.

A note on Noctuid larvae found in Ant's Nests (Lepidoptera; Hymenoptera: Formicidae).

A collection of a part of a colony of *Formica rufa obscuripes* Forel, together with some of the material of the nest was made at Seattle, Washington, in March, 1939. This material, including the ants, was placed in an observation nest in the laboratory and kept for two months. The ants were given generous amounts of honey and water, as well as bits of insects for food. During this time 6 female and 4 male moths emerged from pupal cases in the rubble of the nest. Examination of the nest material revealed 12 pupal cases still occupied, and 8 larvae not yet pupated. The pupal cases of the moths were made from fragments of the nest—straw, leaves, etc., held loosely together by silk. When a newly emerged moth alighted in the nest a passing ant would attack it, but the numerous larvae and pupae were undisturbed by the ants.

Noctuids of the genus *Epizeuxis* are known to lay eggs in decaying leaves (Holland, W. J. "The Moth Book" 1937) and other forest detritus. C. V. Riley (Amer. Naturalist; vol. 17, 1883 also Insect Life; vol. 4, 1892) reports the common occurrence of the larvae of *E. americalis* Guenée in nests of *F. rufa*. Wheeler (Ants, 1910) describes the caterpillars as neutral synoeketes, obtaining their food as scavengers in the middens of the nests.

It is remarkable, however, that the adults of these moths which are evidently subject to attack by the ants, would have an opportunity to oviposit on an ant mound.

Several of the moths which emerged in the laboratory were sent to Prof. Wm. T. M. Forbes, who confirms my identification in saying that these are probably a pale western race of *Epizeuxis americalis* Guenée.—FALCONER SMITH, B-258 Biological Laboratory, Harvard University, Cambridge, Mass.

War Damage to Entomology.

An identical note in the January, 1941, issues of the *Entomologists' Monthly Magazine* and *The Entomologist*, London, states that "Owing to enemy action almost the whole of the archives of the Society for British Entomology and practically the whole of the stock of back numbers of *Transactions* and *Journal* have been completely destroyed, including the current list of names and addresses of members." Our sympathy to our British colleagues.

Current Entomological Literature

COMPILED BY V. S. L. PATE, L. S. MACKEY and J. W. CADBURY.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the current or preceding year unless otherwise noted. All continued papers, with few exceptions, are recorded only at their first installment.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Note. References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of **Entomological News** for 10c. The number of, or annual **volume,** and in some cases the part, heft, &c., the latter **within** ( ) follows; then the pagination follows the colon :

Papers published in the Entomological News are not listed.

GENERAL.—Goodnight, C. J.—Insects taken by the southern pitcher plant. [Trans. Ill. State Acad. Sci.] 33: 213. **Hayes, W. P.**—Some recent works on the classification of immature insects. [103] 14: 3-11. **Lutz, Adolpho.**—Obituary with portrait by T. Borgmeier. [105] 11: 963-966. **McColloch, James Walker.**—Obituary by G. A. Dean. [103] 14: 1-2. **Murphy, M.**—Household Insects. [Georgia Dept. Ent.] Bull. 21: 1-39, ill. **Needham. J. G.**—Insects from the seed pods of the primrose willow, Jussiaea angustifolia. [10] 43: 2-6, ill. **Pinto, C.**—(See under Diptera). **Plaumann, F.**—Ueber das Sammeln im brasilianischen Urwald. [105] 11: 908-920. **Shelford & Twomey.**—Tundra animal communities in the vicinity of Churchill, Manitoba. [84] 22: 47-69. ill. **Smart, J.**—Notes on the localities [in British Guiana and Trinidad] from which the Ceratopogonidae mentioned in Dr. Macfie's paper were taken. [107] A, 9: 194-195. **Smart, J., et al.**—Instructions for Collectors. No. 4a. Insects. vi + 164 pp., ill. London, British Mus. (Nat. Hist.). **Spencer, J. G.**—The control of human lice under war conditions. [4] 73: 20. **Travassos, L., et al.**—Relatorio da excursao cientifica do Instituto Oswaldo Cruz realizada na zona da Estrada de Ferro Noroeste do Brasil, em outubro de 1938. [Bol. Biol., Brasil] 4 (1939): 208-315, ill.

ANATOMY, PHYSIOLOGY, ETC.—de Beaumont, J.—Le determinisme des metamorphoses chez les Insectes (Hormones de metamorphose). [41] 18: 49-57. **Bolwig, N.**—The reproductive organs of Scatophila unicornis (Diptera). [107] A, 15: 97-102, ill. **Bouvier, G.**—Note sur l'Armature genitale des Tabanides. [41] 18: 57-61, ill. **Burt, E. T.**—A filter-feeding mechanism in a larva of the Chironomidae (Diptera). [107] A, 15: 113-121, ill. **Cope, O. B.**—The morphology of Esthiopterum diomedeae (Mallophaga). [117] 5: 117-142, ill. **Eltringham, H.**—The larval gland in Lachnocnema bibulus (Lepidoptera: Lycaenidae). [36] 90: 452-453, ill. **Fox, I.**—The Siphonapteran thorax. [10] 43: 6-10, ill. **Fraser, F. C.**—A comparative study of the penes of the family Gomphidae (Odonata). [36] 90: 541-550, ill. **Mitchell, R. T.**—The alimentary tract of Vespula maculifrons (Hymen.: Vespid.). [43] 41: 29-38, ill. **Pereira, C.**—Sobre a diafanizacao dos artropodos. [105] 11: 642-644. **Pickel, D. B.**—Dermatite purulenta produzida por duas especies de Paederus (Col.: Staphylinid.). [105] 11: 775-793. **Pickles, W.**—Fluctuations in the populations, weights and biomasses of ants at Thornhill, Yorkshire, from 1935-1939. [36] 90: 467-485. **Salt, G.**—Experimental studies in insect parasitism. VII: The effects of different hosts on the parasite Trichogramma evanescens (Hymen. Chalcid.) [107] A, 15: 81-95, ill. **Stahel & Geijskes.**—Observations about temperature and moisture in Atta nests (Hymen: Formicidae). [105] 11: 766-775, ill. **Stanley, J.**—A mathematical theory of the growth of populations of the flour beetle Tribolium confusum. IV: A modified theory descriptive of the relations between the limiting value of egg-populations in the absence of hatching, and the volume (or weight) of flour used in the culture. [84] 22: 23-37, ill. **Wright, G.**—Observations on the fertility of the black widow spider. [Trans. Ill. State Acad. Sci.] 33: 225.

ARACHNIDA AND MYRIOPODA.—Buecherl, W.—Dois novos quilopodos do subgenero Parotostigmus, da colecao do Instituto Butantan. [Bol. Biol., Brasil] 4 (1939): 444-447, ill. **Chamberlin & Ivie.**—Spiders collected by L. W. Saylor and others, mostly in California. [Bull. Univ. Utah] 31: 49 pp., ill. **Heriot, A. D.**—A new character distinguishing Tetranychus pacificus from T. telarius. (Acarina). [4] 73: 1, ill. **Jones, S. E.**—An annotated list of the spiders of an east central Illinois forest (Wm. Trelease

Woods, University of Illinois). [Trans. Ill. State Acad. Sci.] 33: 216-220. **Knight, K. J.**—Illinois distribution records of the black widow spider. [Trans. Ill. State Acad. Sci.] 33: 214-215, ill. **de Mello-Leitão, C.**—Dois gêneros e sete espécies de Goniléptidas sulamericanos. [Bol. Biol., Brasil] 4 (1939): 345-351, ill. Opiliões coligidos pelo Dr. Henry Leonardos no xingú. [Bol. Biol., Brasil] 4 (1939): 352-357, ill.

THE SMALLER ORDERS OF INSECTS.—Arle, R.—Novas espécies de Pseudachorutini do Rio de Janeiro e Arredores. [Bol. Biol., Brasil] 4 (1939): 67-72, ill. **Berner, L.**—Baetine mayflies from Florida. [39] 23: 33-45; 49-62, ill. (*). **Fryer & Edelsten.**—Psectra diptera (Neuroptera: Hemerobiidae) at Woodwalton Fen, Hunts. [8] 76:271. **Ross, H. H.**—N. spp. of Trichoptera from Canada and northern United States. [4] 73: 15-19, ill. **Tillyard, R. J.**—A reclassification of the order Odonata, based on some new interpretations of the venation of the dragonfly wing. Part III. Suborder Anisozygoptera. [Australian Zool.] 9: 359-396, ill. (*k). **Werneck, F. L.**—Notas sobre anopluros. [105] 11: 722-729, ill. (S*).

ORTHOPTERA.—Burks, B. D.—(see Hymenoptera). **Rehn, J. W. H.**—A new genus of mellierid mantid from Venezuela (Manteidae). [Notulae Naturae] No. 70: 4 pp., ill.

HEMIPTERA.—Balduf, W. F.—Ambush bug studies. A summary. [Trans Ill. State Acad. Sci.] 33: 206-208. **Beamer, R. H.**—Two n. sp. of Erythroneura (Cicadell.). [103] 14: 18-19. **Compere, H.**—Parasites of the black scale, Saissetia oleae, in Africa. [Hilgardia] 13: 387-425, ill. **da Costa Lima, A.**—Espécies de Pseudococcus observadas no Brasil. [Bol. Biol., Brasil] 4 (1939): 1-10, ill. **Curtiss, C.**—The alfafa plant bug, Adelphocoris lineolatus, found in Kansas. [103] 14: 25-26. **Lent & Pifano.**—Sobre a identidade dos generos Panstrongylus Berg, 1879 e Mestor Kirkaldy, 1904. Redescricao de Panstrongylus rufotuberculatus encontrado, na Venezuela, naturalmente infestado pelo Schizotrypanum cruzi. [105] 11: 629-639, ill. (S). **Lent & Viana Martins.**—Estudos sobre os Triatomideos do Estado de Minas Geraes, com descricao de uma especie nova. [105] 11: 877-886, ill. **Mendes, L. O. T.**—Dysdercus da coleção da escola nacional de Agronomia. [Bol. Biol., Brasil] 4

(1939): 98. **Monte, O.**—Sphaerocysta brasiliensis (Tingitid.). [Bol. Biol., Brasil] 4 (1939): 516-518, ill. **Sailer, R. I.**—Additional notes on Galgupha loboprostethia (Thyreocorinae). [103] 14: 19. **Usinger, R. L.**—A n. sp. of Aradus from Brazil. [105] 11: 639-642, ill.

LEPIDOPTERA.—Bourquin, F.—Contribution al estudio de la metamorfosis de los lepidopteros argentinos. [105] 11: 809-820, ill. **Davenport, D.**—The butterflies of the Satyrid genus Coenonympha. [Bull. M. C. Z.] 87: 215-349, ill. (b*). **Ferreira d'Almeida, R.**—Contribuicao ao estudo dos Mechanitidae. [105] 11: 758-766, ill. (S*). Revisão do gênero Appias (subgen. Glutophrissa). [Bol. Biol., Brasil] 4 (1939): 50-66, ill. Revisao do genero Aphrissa. (Pierid.). [Bol. Biol., Brasil] 4 (1939): 423-443, ill. **de Figueiredo, E. R., Jr.**—Notas sobre a Thridia themisto Huebn., 1823, praga do manaca [Bol. Biol., Brasil] 4 (1939): 512-515, ill. **Hayward, K. J.**—N. sp. of Neotropical Hesperiidae from Ecuador. [105] 11: 861-877, ill. **Jordan, K.**—Results of the Oxford University Biological Expedition to the Cayman Islands, 1938: Sphingidae. [8] 76: 275-277. **Kaye, W. J.**—Additions and corrections to the recorded species of Trinidad butterflies. [36] 90: 551-573. **Santos, N.**—Contribuiçã ao conhecimento dos Euchromiidae. [Bol. Biol., Brasil] 4 (1939): 87-97, ill. **Stallings, D. B.**—New records of Lepidoptera for Sumner Co., Kansas. [103] 14: 16. New records of butterflies for Kansas, [103] 14: 21. A freak butterfly. [103] 14: 26. **Stephan, J.**—Clothilda (Rhopal.). [18] 54: 181-184, (S). **Travassos, L.**—Contribuicao ao conhecimento dos Adelocephalidae. [105] 11: 682-690, ill. (*). Contribuicao para o conhecimento dos Euchromiidae. V. Genero Isanthrene. [Bol. Biol., Brasil] 4 (1939): 454-472, ill.

DIPTERA.—Aitken, T. H. G.—The gen. Psorophora in California (Culicidae). [105] 11: 672-682, ill. **Alexander, C. P.**—Further observations on the Psychodid subfam. Bruchomyinae. [105] 11: 793-799, ill. (kS*). Records and descriptions of Tipulidae from tropical America, Pt. 3. [105] 11: 894-908, ill. **Antunes & Coutinho.**—Notas sobre Flebotomos Sul-Americanos. Descricao de Flebotomus whitmani n. sp. e da armadura bucal de algumas especies. [Bol. Biol., Brasil] 4 (1939): 448-453, ill. **Antunes & Ramos.**—Culex (Carrollia) iridescens, bonnei e soperi (Culicid.). [Bol. Biol., Brasil] 4 (1939): 374-385, ill.

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SPECIAL NOTICES.—Adaptive Coloration in Animals. By Cott, H. B., xxxii + 508 pp., ill. Methuen & Co., London. **Insetos do Brasil.** By da Costa Lima, A., vol. 2: Hemipteros. 351 pp. Rio de Janeiro. **New Systematics.** By Huxley et al. 583 pp. Oxford, Clarendon Press.

ENTOMOPHAGOUS INSECTS By CURTIS P. CLAUSEN. First Edition McGraw-Hill Book Co., New York and London 1940 pp. x+688. 257 figures. Price $7.50. In the study of insect biology, the unusual and amazing seems almost to be the usual state of affairs; and perhaps nowhere is there a greater assemblage of remarkable adaptations, a greater variety of intricate modification of structures, developmental peculiarities and behavior than among the entomophagous insects described in this book. Most of the forms dealt with are the parasitic insects, those sometimes referred to as predaceous parasites, for the planidium larva, which pounces upon a caterpillar and proceeds to devour it or some other parasite already present, is, in a sense, also a predator. But Dr. Clausen prefers the established terminology and avoids even the term "parasitoid." Indeed, he shows little concern regarding definitions and theories for he is anxious to get on with his job, a very sizable one, that of telling us what is actually known of the biology of all the insect-eating insects. Proceeding at once with the Hymenoptera, he first makes what generalizations are possible on the habits of this group as to egg placement, feeding, sex, reproduction, phoresy and then he describes the types of immature stages, cites the effect upon the host and discusses sex ratios. There is a great deal of detailed information on numerous species—the anatomy of the larvae, their development and host relationships—all presented not as a mere compilation but in a thoroughly digested and integrated form. The many curious forms of larvae are illustrated by figures as are also representative adult types. Then follow the aculeate Hymenoptera containing both predaceous and parasitic forms as well as many that are difficult to classify. The Diptera are discussed according to the same plan as the Hymenoptera. The Lepidoptera, Coleoptera, Hemiptera and 10 smaller orders are taken up in turn; and in each case most attention is given to the forms that are most highly specialized in their host relationships. Altogether this volume will be of great value to entomologists and parasitologists, for it represents the compilation and synthesis of a great mass of information from numerous sources, including many foreign entomological and agricultural publications and reports, that is not otherwise available to the working investigator. The book will be of use also to those interested in general biological problems such as sex determination, sex ratios, reflexes, behavior, diapause, polyembryony, etc. On each of these topics there is much information included under the families concerned and so indexed, usually, rather than as first-

place index entries. The list of references, all cited in the text, takes up 47 pages. The index lists all forms mentioned, including host species.—R. G. SCHMIEDER.

PLANT GALLS AND GALL MAKERS by EPHRAIM PORTER FELT, Director and Chief Entomologist, Bartlett Tree Research Laboratories, etc., Ithaca, New York. Comstock Publishing Co., Inc., 1940. Pp. viii, 364, 344 text figs., 41 plates. $4.00.—Dr. Felt says in his preface: "This work is an extended revision, a rewritten version with much additional matter, of the author's 'Key to American Insect Galls' which appeared as New York State Museum Bulletin No. 200 in 1917 [1918]. The demand for the bulletin was so great that the edition was speedily exhausted." The bulletin of 1918 comprised 310 pages, including 16 plates and 250 text-figures, so that the net increase in the present volume is 62 pages. The plates in 1918 were massed near the end of the book, just before the index; here they are interspersed throughout the text. *Plant Galls and Gall Makers* is divided into two parts: I. Introduction pp. 4-35, II. Key to the galls of the various plant families pp. 37-338. Following is a bibliography pp. 339-340 and the index pp. 341-364. The introduction is much more extensive than the 14 pages similarly labeled in the 1918 bulletin, except that the tabulation of plants and American insect galls (p. 31) is a very much compressed summary of tables occupying 14 pages (215-228) in 1918. The introduction discusses galls and gall types, gall producers, injurious and valuable galls, honeydew producing galls, how galls are produced, life history of gall producers, alternation of generations*, insects and fungous galls, distribution and abundance of gall insects, gall insects in different parts of the world (especially those of Asia, the Dutch East Indies, southern Europe, middle Europe, Moravia, North, South and Central America), gall insect preferences for host plants in America, natural checks, collecting galls and studying gall insects—an interesting summary. The main body of the book, the key to the galls, follows in general the treatment of 1918, but with frequent differences in detail, or in minor sequence.

* In this section Dr. Felt remarks: "Investigations in Europe show that a relatively large number of oak gall wasps have alternating generations. There are probably more than 600 oak galls occurring upon American oaks and as yet the direct connection between the two generations has been established for relatively few." This is illustrated by his list of "The known agamic and bisexual forms of American gall wasps" (pp. 22-25) which contains 17 species and varieties.

The references to the descriptions of each gall or its maker are, however, omitted. At the head of each plant family a general discussion of its galls and gall makers has been added. Most (all?) of the illustrations of 1918 are reproduced but are often redistributed; many others, principally from the works of Kinsey and of Weld, have been added. Under "Bibliography," Dr. Felt says "The author has given an extended bibliography in his . . . Bulletin No. 200, 1918. The following is limited to the more important works which have appeared subsequently." It is composed of 18 titles from 1920 to 1938, arranged chronologically. The earlier list of 282 titles runs from 1841 to 1918. How far the present work is a betterment of its predecessor must be left to the specialists to decide, but it appears to be a very useful volume, and the bulletin of 1918 may be still be kept alongside it, for bibliographical assistance.—P. P. CALVERT.

OBITUARY

HERMANN SCHWARZ died suddenly at Webster Groves, Missouri, on March 21, 1940. He was born in Osnabruck, Germany, March 27, 1876 and came to America when 9 years old. He was the youngest of four brothers, all naturalists. Entirely self-educated, he eventually attained to the leadership of the naturalists of St. Louis and surrounding territory. Interested in all phases of natural history, he belonged to many nature study and scientific societies, being one of the organizers of the St. Louis Naturalists Club and the St. Louis Entomological Club. In recent years he was very active in Boy Scout work, being a member of the Court of Honor and chairman of the Science Section. It was while making the awards to four Eagle Scouts that he collapsed and almost immediately afterwards died. Mr. Schwarz was in the printing business, but for a number of years conducted the Mid-West Nature Supply House as a hobby. He contributed the following articles to ENTOMOLOGICAL NEWS: "A Setting-block for Lepidoptera" (1898), "The Art of Collecting Catocala" (1899), "A Convention of Entomologists at the home of Dr. Wm. Barnes" (1910), "The St. Louis Entomological Club" (1911), "Miss Mary Murtfeldt" (1913), and jointly with Henry McElhose

"List of 110 Species and Varieties of Butterflies taken by Members of the St. Louis Entomological Club in the Vicinity of St. Louis, Mo." (1907). He had a collection of butterflies taken in Missouri.—EDWIN P. MEINERS.

Dr. GEORGE W. BOCK died in St. Louis, Missouri, July 22, 1940. He was at one time a very enthusiastic beetle collector and carried on a rather extensive correspondence with many of the older collectors. He built up a collection said to number about 45,000 specimens. Born in Hamelin, Germany, June 23, 1856, he came to the United States when he was 24 years of age. Eventually he settled to the practice of medicine in St. Louis, in which he continued until a few years ago, being compelled to retire due to the infirmities of age. Dr. Bock collected principally in the vicinity of St. Louis, but in his early years made two rather extensive collecting trips, one to Guatemala and another to Mexico. He was one of the organizers of the St. Louis Naturalists Club and at one time a member of the St. Louis Entomological Club. He contributed an article to the December, 1907, number of ENTOMOLOGICAL NEWS on "An absolutely sure method of preservation of Natural Scientific collections against insect enemies".—EDWIN P. MEINERS.

AUGUST KNETZGER died at his home in Alton, Illinois, on July 2, 1940, at the age of 73 years. Mr. Knetzger, who was a musician by profession, was at one time an ardent student of the Lepidoptera and contributed the following articles to ENTOMOLOGICAL NEWS between the years 1907 and 1912: "St. Louis Butterflies", "Migration of Anosia plexippus", "Notes on Missouri Lepidoptera", and "Observations on the Lepidoptera of St. Louis, Mo. and vicinity during 1911". He was at one time a member of the Heink Entomological Club and the St. Louis Entomological Club. He recently gave his collection of 8,000 butterflies to the Pere Marquette State Park at Grafton, Illinois.—EDWIN P. MEINERS.

CHARLES L. HEINK died at his home in St. Louis, Missouri, on June 8, 1940. Although not a scientist in the strict sense of the word, Mr. Heink did much to interest others in the

study of insects. He was particularly concerned with the Lepidoptera, of which he formed a considerable collection. He was much interested in the early stages and reared many of his specimens from the egg and larvae. All of his collecting was done in the region around St. Louis, his collection being built up through the exchange of his duplicates.

EDWIN P. MEINERS.

A memorandum on the back of Mr. Heink's photographic portrait, in the collection of the American Entomological Society, states that he was born February 9, 1869, at Stonyhill, Gasconade County, Missouri, and organized the Heink Entomological Club, December 15, 1907.—E. T. CRESSON, Jr.

Mrs. VITAE KITE died at Hollister, Taney County, Missouri, February 14, 1940. "A Calendar of Ozark Butterflies" appeared from her pen in ENTOMOLOGICAL NEWS for February, 1934. Starting late in life to form a collection of butterflies, she built up a collection of about 10,000 specimens, mostly locals and exotics. This collection has been given to The School of the Ozarks at Point Lookout, Missouri.—EDWIN P. MEINERS.

DR. CLARENCE PRESTON GILLETTE, director emeritus of the Colorado Agricultural Experiment Station and emeritus professor of entomology and zoology at Colorado State College of Agriculture and Mechanical Arts, died at his home in Fort Collins, Colorado, on January 4, 1941. Born in Ionia County, Michigan, April 7, 1859, he attended the Michigan public schools, then Michigan State College, where he received the B.S. in 1884, the M.S. in 1887 and the honorary Sc.D. in 1918. He was assistant in zoology, Michigan State College, until 1888, when he became entomologist of the Iowa State College Experiment Station at Ames, Iowa, and in 1891, head of a new department of zoology, entomology and physiology at Colorado State College. In 1907, he became Colorado's first state entomologist, and in 1910, also director of the Colorado Experiment Station, until his retirement in 1932. His papers include lists of the Orthoptera and Hemiptera of Colorado, many articles dealing with Cynipidae, Cicadellidae and Aphidae, and his last important work, the Aphidae of Colorado, published jointly with Miss Miriam A. Palmer. (From obituary by DR. GEO. M. LIST in *Science* for February 28, 1941.)

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted.—To hear from specialists who would care to determine some family of insects for a share of the duplicates. We have many specimens, especially in some families of Diptera and Hymenoptera. H. E. Jaques, Iowa Insect Survey, Mt. Pleasant, Iowa.

Insects from Northern Korea.—I will collect insects for specialists in certain groups upon their request; very rich fauna; rates reasonable. Address: Mr. Alexander M. Yankovsky, Shuotsu-Ompo, Korea, Japan.

Wanted—Living specimens of the luminous beetle **Phengodes** this summer. E. Newton Harvey, The Biology Dept., Princeton University, Princeton, New Jersey.

Malacodermata (except Lycidae and Cleridae) of the world. Will determine and purchase. Also exchange against Col. or all other insects from Bolivia. Walter Wittmer, Casilla 852, La Paz, Bolivia, S. America.

I want to collect Rothschildia, agapema, gulfina and io moths and Texas butterflies for interested persons. Eula Frizzell, R 4 San Benito, Texas.

Wanted—To hear from collectors who desire extra good cocoons of Michigan **Platysamia columbia,** that will emerge June, 1941. W. S. McAlpine, 575 Townsend St., Birmngham, Michigan.

Wanted—Specimens of the genus Trox from North America. Will exchange or determine for duplicate material. Mark Robinson, 231 Cherry St., Sharon Hill, Pennsylvania.

Lepidoptera—From the South, including P. palamedes, T. halesus and E. jucunda to exchange for fauna from other localities. H. W. Eustis, 2230 McDowell St., Augusta, Georgia.

Wanted—Egg cases of preying mantids. Correspondence desired with those who will collect. Osmond P. Breland, Department of Zoology, The University of Texas, Austin, Texas.

Wanted—To buy, specimens of bees of the genus **Nomada,** any quantity, especially North American. Quote price, locality. Hugo G. Rodeck, University of Colorado Museum, Boulder Colorado.

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